Staff Summary
Method 2B Application

Clean Energy: Pinnacle Gas Producers, LLC Landfill Gas from Moraine, Ohio, to Compressed Natural Gas, Liquefied Natural Gas, and Liquefied-Compressed Natural Gas Delivered in California (Pathway Codes: CNG022, CNG023, and LNG020)

Deemed Complete Date: September 3, 2014
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Pathway Summary

Clean Energy has applied for three landfill-gas-to-biomethane fuel pathways. The landfill gas (LFG) for all three pathways is extracted from both the Pinnacle Road Landfill and the Stony Hill Landfill in Moraine, Ohio. One pathway covers the liquefaction of the resulting biomethane at Clean Energy's Boron, California liquefaction facility and the dispensing of the fuel as liquefied natural gas (LNG); one pathway covers the liquefaction of the resulting biomethane at Clean Energy's Boron, California liquefaction facility and the subsequent vaporization and compression of the liquefied natural gas into compressed natural gas (CNG); and the final pathway covers the compression of the biomethane for dispensing at CNG fueling stations. All fueling stations covered by these pathways are located in California.

LFG from the Pinnacle and Stony Hill landfills is cleaned up using grid electricity and natural gas. Natural gas is used in the compressor, thermal oxidizer, and flare pilot. The thermal oxidizer and flare are used to destroy LFG when the processing plant is not fully operational.

The Pinnacle pathway utilizes the CA-GREET1.8b default values for LFG recovery. To determine combustion emissions from the consumed natural gas, the flare and the thermal oxidizer, the CA-GREET1.8b default values for natural gas combustion in a turbine were used. These emissions are more representative of operations at the Pinnacle plant than are the emission factors for a compressor powered by a natural gas I.C. engine.

The biomethane Clean Energy purchases from the Pinnacle LFG processing plant is injected into the interstate pipeline system for conveyance to Clean Energy's LNG plant in Boron, California. The pipeline transport distance is 2,210 miles. As such, Clean Energy will be obligated to retain records that unequivocally demonstrate that the credits it earns under the pathways described in this Summary correspond directly with the volumes of biomethane it purchases from the Pinnacle Road and Stony Hill Landfills in Moraine, Ohio.

Carbon Intensity of CNG, LNG, and L-CNG Produced

As shown in table below, the applicant has calculated the CIs of its CNG, LNG, and L-CNG pathways to be 21.01, 25.50, and 27.62 gCO_2e/MJ, respectively.

Operating Conditions

1. Actual pathway energy consumption values shall remain at or below the levels specified in Clean Energy's application. These pathways were calculated using LFG production data covering calendar years 2012 and 2013 and LNG liquefaction and CNG compression data covering calendar years 2011 and 2012. The recovery and processing efficiency levels at the Pinnacle Road Landfill and the Stony Hill Landfill in Moraine, Ohio shall remain at or above the levels specified in the Clean Energy's application[1]. In addition, the liquefaction efficiency at the Boron LNG plant and the compression efficiency level at the L-CNG stations in California shall remain at or above the levels specified in the application. Energy consumption values for these facilities are classified by the applicant as confidential business information.
2. Because the biomethane supplied under this pathway is commingled with fossil NG both when it enters the interstate pipeline system and when it enters Clean Energy's Boron liquefaction facility, Clean Energy must maintain an accounting system that will enable it to demonstrate unequivocally at any time that every unit of biomethane-based transportation fuel sold and reported under the LCFS can be associated with an equal unit of biomethane purchased from the Pinnacle Road and Stony Hill Landfills.

[1] Clean Energy assumed recovery and processing efficiencies equivalent to those used in pathway LNG007: http://www.arb.ca.gov/fuels/lcfs/022709lcfs_lfg.pdf

Biomethane Pathways Lookup Table Entries for Pinnacle Plant

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity Values (gCO_2e/MJ)		
			Direct Emissions	Land Use or Other Indirect Effects	Total
CNG from LFG	CNG022	2B Application*: Ohio landfill gas to pipeline-quality biomethane; delivered via pipeline; compressed to CNG in CA	21.01	0	21.01
L-CNG from LFG	CNG023	2B Application*: Ohio landfill gas to pipeline-quality biomethane, delivered via pipeline, liquefied in CA; transported by trucks; re-gasified and compressed to L-CNG in CA	27.62	0	27.62
LNG from LFG	LNG020	2B Application*: Ohio landfill gas to pipeline-quality biomethane; delivered via pipeline; liquefied to LNG in CA	25.50	0	25.50

* Specific Conditions Apply.

Staff Analysis and Recommendations

Staff has reviewed Clean Energy's Pinnacle application for the production of CNG, L-CNG, and LNG from LFG originating in Moraine, Ohio. Staff has replicated, using the CA-GREET1.8b spreadsheet, the CI values calculated by Clean Energy. Clean Energy has provided documentation in support of the key components of its pathways: energy consumption at the Ohio LFG processing plant, the California liquefaction plant, and Clean Energy's California CNG fueling stations. It has also provided the volumes of LNG and CNG produced. Staff is satisfied that the energy consumption levels reported in Clean Energy's application accurately represent actual usage for the time period for which records were submitted, and that Clean Energy is capable of maintaining CIs that are at or below those shown in the table above. Therefore, staff recommends that Clean Energy's application for Method 2B LFG-to-CNG, LFG-to-LNG, and LFG-to-L-CNG pathways be certified.